strength and dimensional stability) of the wood products. After about 12-20 years of growth, density begins to increase as wood is laid down at greater distances from the pith and the microfibril angle begins to decrease until the wood has acquired "adult" properties. Under normal conditions during the wood's "mature stage", density, microfibril angle, and chemicals of the wood remain essentially constant during the remaining years of the tree's growth. Therefore, logs harvested from the short-rotation plantations may be prone to both warp and lower stiffness.

Dimension lumber is the major construction material for residential and commercial buildings in North America. Stiffness and straightness are the critical attributes of structural lumber and engineered wood products for builders, the main customers of lumber. Failure to make the products that will meet the specifications of the builders potentially costs the commercial forestry industry large sums of money. For instance, the influx of plantation wood has made it more difficult for mills to produce stiff and straight lumber at prices the builders are prepared to pay, which is currently causing wood from plantations to be downgraded, resulting in lost market share to substitutes such as steel, vinyl, and engineered wood products as a construction material. As such, the earlier the industry can select and sort the wood quality during the commercial forest cycle, from breeding to products, the more efficient the industry will be. Therefore, there is a need in the industry to have testing techniques that predict wood properties, particularly stiffness, of standing trees, preferably in the early phases of a plantation forest cycle.

To address such an ongoing need of the commercial forest industry, non-destructive testing devices and methods have been developed that utilize acoustic techniques for non-destructive testing of wood properties, such as warp propensity, stiffness, and degree of decay, of standing trees or felled logs. Several of these devices and methods are disclosed in U.S. Patent No. 6,347,551 B1, U.S. Patent No. 6,276,209 B1, U.S. Patent No. 6,026,689, U.S. Patent No. 6,305,224 B1, and U.S. Patent Application Publication US 2003/0079544 A1 and PCT Publication No. WO 02/29398 A1, all of which are hereby incorporated by reference.

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While these prior art devices and methods are adequate in testing wood properties in either standing trees or felled logs, the devices and methods are not without their deficiencies or disadvantages. For instance, the prior art devices and methods were not